

The Effects of Movement Based Learning on Student  
Achievement in the Elementary School Classroom

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Abstract

The purpose of this study was to determine if physical movement would increase student learning. Students were involved in daily movement activities in order to stimulate the brain for optimal learning. The movement activities from Brain Gym were integrated into the second grade curriculum. Brain Gym is an educational curriculum that promotes whole-brain learning through movement re-patterning to improve students performance and attitudes about the learning process. Data was collected on

the students' DRA Reading Scores, STAR Tests, Successmaker Tests, and daily journals. At the conclusion of the study, the majority of the students' test scores and grades had improved. Findings indicated that the students in a physical movement study could increase their learning, attention, and attitudes. As a result, movement can be used to support enhanced student learning and achievement in the classroom.

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## Introduction

Educators have always been interested in how they can help students learn. Movement based learning demonstrates the importance of movement in the learning process by teaching academics kinesthetically (Blaydes, 2002.) Blaydes says that

it is helpful to think of the brain as a muscle. "One of the best ways to maximize it is through exercise and movement" (Blaydes, 2002, p. 1).

Educational Kinesiology is a simple and highly effective system of targeted activities that prepare the brain and the entire nervous system for optimal performance in all areas. It is based on the principle that moving your body maximizes your brain power. Simple physical movements can bring about rapid and automatic improvements in such skills as memory, reading, concentration, and communication. She also states that there are noticeable gains in creativity, energy levels, and performance.

There are multiple good reasons to incorporate regular physical activity and movement in your classroom. Movement increases heart rate and subsequent circulation, therefore, performance. Studies show an increased performance following movement activities (Tomprowski and Ellis, 1986). In addition, increased movement tends to narrow attention to target tasks (Easterbrook, 1999). Stretching, which increases fluid flow to critical areas, is an example of a productive movement activity. While it increases oxygen to key brain areas, stretching also provides an opportunity for the eyes and musculo-skeletal system to relax (Henning, et al. 1997).

Every physical, emotional, and cognitive state is comprised of a different rhythm in the brain. Have you ever thought of something you wanted from another room in your house, but by the time you get there you can't remember what it was? First we have to have the knowledge, and then we have to be able to recover it in order for it to be helpful. Practicing learning in multiple states of mind may develop greater cognitive flexibility and recall. "Breaking up content learning with physical movement is more effective than excessive content dumping" (Jensen, 2000).

While learning can be accomplished in sedentary fashion, it turns out that the typical notion of keeping students in desks for extended periods of time may be misguided. The human body was created to walk, run, and skip, but not sit in chairs. Sitting for long periods of time takes its toll on students. Is there a solution? Yes, there are simple remedies: engage students in a variety of movements including walking, swinging, spinning, and skipping. Movement is important because: "Movement develops neural connections. It actually builds the brain" (Dennison, 1994).

The purpose of this study is to determine how I can increase my students' learning abilities by adding movement in my classroom.

### Literature Review

"Movement is the door to learning" (Dennison and Dennison, 1989). How will the integration of movement activities in the classroom enhance learning?

While researching the effects of movement on cognition, the program Brain Gym continually was in the forefront of much

research. Brain Gym activities were developed by Dennison, Ph.D. and coauthored by his wife. Brain Gym is an educational curriculum that promotes whole brain learning through movement re-patterning to improve students' performance and attitudes about the learning process (Jensen, & Templeton, 2004). The Brain Gym program has been integrated in many different avenues of life and learning. Some of these avenues include:

- Reducing the stress of students
- Mental focusing
- Many areas of therapy
- Waking up body/mind systems
- Increase academic achievement (Hannafor, 1995 & excellability.com, 2004).

"We are all natural learners, born with a remarkable mind/body system equipped with all the elements necessary for learning. Various stressors, however, can introduce blocks that inhibit the learning process" (Hannafor, 1995, p. 109).

According to Jensen "*on-off stress*" is healthy, while long term stress has negative effects on our bodies. Stress leads to the death of brain cells in the hippocampus, (the part of the brain that stores and processes memories) which is critical to explicit memory formation (Jensen, 1998). Jensen also states that chronic or long-term stress impairs a student's

ability to sort out what's important and what's not important. Long-term stress interferes with the immune system and causes increased susceptibility to illnesses. Stress due to illness increases school absences and the reduction of student-learning time. "Brain Gym activities reduce the blockages caused by stress and allow the body to function in an optimal state of learning and self-control" (Jensen, & Templeton, 1996, p.8).

Another aspect of Brain Gym is the ability to focus mentally. "Getting the students' attention and keeping it has been the brass ring in the world of teaching" (Jensen, 1998, p. 41). Much has been written about the causes of attention disorders such as: Attention Deficit Hyperactive Disorder (ADHD), Attention Deficit Disorder (ADD), dyslexia and other learning disabilities. "In the United States, attention deficit disorders accounts for almost half of all child psychiatric referrals" (Wilder as stated in Jensen, 1998, p.49). Hannaford suggests that the lack of movement early in life can cause vestibular system developmental delays, which can contribute to attention disorders (Hannaford, 1995). She goes on to state that the vestibular system is important for students to be alert and responsive. The vestibular system coordinates body movements, maintains balance and equilibrium, and helps children develop normal muscle tone. The vestibular system plays a significant role in the development of language,



so that children with vestibular dysfunction may also have auditory-language processing problems.

"When children are physically active, they are more readily attending to the learning task" (Pica, 1999, p. XI). Pica continues to say that physical activity helps prevent children's attention from being distracted by extraneous factors. "With merry-go-rounds and swings disappearing from parks and playgrounds as fast as liability costs go up, there's a new worry: more learning disabilities," (p. XI). Also, Clark's studies suggest that "certain spinning activities led to alertness, attention and relaxation in the classroom" (pesoftware.com, 2004, p. 6). "Something as simple as standing up, increases oxygen to the brain which then increases focus and attentiveness" (homeschoolhelper.com, 2004, p. 2).

Another simple activity to increase attention would be to do jumping jacks with the hands crossing over each other. This simple movement should help the students concentrate by reconnecting both hemispheres of the brain (Blakemore, 2003, p.5). Movement increases our brain activity, which then allows us to narrow our attention to the task at hand (Jensen, 2000).

Studies also suggest that using Brain Gym in the classroom not only allows students a chance to move but also enables them to feel a sense of hope (Jensen, & Templeton, 1996). Along with the feelings of self-worth, Brain Gym activities can

enhance social skills. While working as a school counselor, Hannaforð would use movement activities from Brain Gym to work with "emotionally handicapped" children. By using these movement activities, she was able to "re-pattern" their brain functioning of the frontal lobes. This enabled the students to release their tensions, express their frustrations and cultivate honesty (Hannaforð, 1995). Research states that movement regulates a persons moods and how they react to any given situation. Jensen quotes Thayer, in his book *Learning with the Body in Mind*, "The data suggests that exercise is the best overall mood regulator" (Thayer, 2000, p. 38).

At birth infants are equipped with developed areas of the brain that are programmed for survival (Caine & Caine, 1994). Other research collaborates with the idea that the neural connections are predetermined, such as breathing, and control of heartbeat, others are stimulated from environment and experiences (Gabbard, & Rodrigues, 2004).

From birth, the brain is developing and changing to adapt to the environment in which it is exposed to (Jensen, 1998). At least as important as genetically programmed brain development is what has been called brain plasticity. It means that the physical structure of the brain changes as the result of experience (Caine & Caine, 1994,). Movement plays an important part of developing the physical brain.

Movement develops neural connections and actually builds the brain (Landalf, 2000). Gabbard and Rodrigues believe that the "unprogrammed" connections have windows of opportunities. They continue to state that the window of opportunity for forming foundations of gross-motor skills is birth to five years of age. These circuits are important for higher level learning skills. If these connections are not made, the brain *prunes away* the unused neurons.

Brain Gym states that specific movements can reverse unused connections and stimulate brain development. Research states that Brain Gym exercises can greatly reduce or eliminate symptoms attributed to hyperactivity, learning disabilities, Attention Deficit Disorder, emotional handicaps and Fetal Alcohol Syndrome (Hannaford, 1990). The old adage of "*use it or lose it*" does apply to brain connections and movement (Boon, 2004, p. 3). Few researchers would deny that early movement experiences are critical to optimal brain development. "To be of maximum benefit, movement experiences should be introduced early in life and during the windows of opportunity" (Gabbard, & Rodrigues, 2004, p. 3).

"Movement stimulates increasing diversity of connections, which allows thought to spread beyond its original focus. Now we can "think outside the square" (Boon, 2004, p. 3). Boon continues to state that every movement is a sensory motor

event, and movement activity is required (2004). Movement helps children to retain what they've learned. "Children remember only 20% of what they hear and 30% of what they see. But children remember 90% of what they see, hear, say and DO" (Landalf, 2004, p. 1)!

A study conducted by Dr. Donczik, involving eighty-one students identified as dyslexic, used the Brain Gym Dennison Laterality Re-patterning (DLR). The study showed that DLR improved 100% of the students involving the area of reading (Donczik, 2004). Donczik's study revealed that there was regression if the Brain Gym exercises were not used consistently. "Fortunately, even just a few of the Brain Gym exercises sufficed to reinstate the previous level of performance" (Donczik, 2004, p. 9).

Movement can help reinforce academic skills for all students. "Eighty-five percent of school age children are natural kinesthetic learners" (Hannafor as stated in Blaydes, 2004, p. 4). Many who are doing poorly in school are tactile or kinesthetic learners. Exploring the concept through movement gives the child an opportunity to do and know. Movement in all content areas promotes learning and retention (Pica, 2004).

Another program to integrate movement into the classroom is called Boost-Up/SMART. This program was developed by a group of parents that wanted to help their children. The children

had many special needs including: learning disabilities, brain damage, and ADD/ADHD. According to the Boost-Up/SMART Program, learning difficulties for bright children show up when they are learning to read. The program stresses the importance of physical balance, being able to track left to right, up and down with eye movement. Children need these skills before starting school (Boost-Up, 2003).

Some scientists believe children are lacking the school readiness skills due to restricted movement as young children. Today's infant is "baby-sat" by television, seated in a walker, or strapped in a car seat for hundreds of precious motor development hours. "In 1960, the average 2-year-old spent an estimated 200 hours in a car. Today's 2-year-old spends an estimated 500 hours in a car seat" (Jensen, 1998, p. 21)!

Palmer, one of the key developers of Boost-Up/SMART (Stimulating Maturity through Accelerated Readiness Training) program, agrees that children are not stimulated for school readiness (Jensen, 1998). In Jensen's book *"Teaching with the Brain in Mind"*, Palmer states, "The human brain is the most responsive organ you could imagine ...we usually don't even get around to doing the basics" (Jensen, 1998 p. 21). "Boost-Up/SMART accepts as true that with certain physical movements a person's capacity to learn new and remember old information is increased" (actg, 2002, p. 1).

"Boost Up/SMART and the Brain Gym programs both agree that children enter school not ready to learn. School readiness, as defined by the Boost Up/SMART program is having the brain stimulated and ready for learning. Being able to sit, pay attention and write their names is not school readiness. If the brain is not stimulated and ready to learn, children will show signs of learning difficulties" (DeBoer, 2004).

Boost Up/SMART, like the Brain Gym program, believes that stimulating the brain through the use of movement increases the child's ability to learn. "The Boost Up/SMART curriculum uses specific movements to develop the vestibular and mobility skills needed to stimulate the brain" (SMART Curriculum Guide, 2004, p. 3).

Stimulating the vestibular system by using movement is a key foundation for learning (Promislow, 2003). "The vestibular system, which controls our sense of balance and movement, is also centered in the ear. The vestibular system is interconnected to the cerebral cortex, as well as the eyes and core muscles, and is highly important to the learning process" (Promislow, 2003, p. 123).

The Learning Triangle in Figure 1, shows the steps of the developing brain. D.N.A., we are born with, reflexes are automatic (survival mode), and the brain stem development (tactile, vestibular and proprioceptive) is learned through

movement. The Boost Up/SMART program's main goal is to stimulate the brain stem (DeBoer, 2004).



Figure 1

Integrating activities to stimulate the brain stem may include: spinning, cross pattern walking, laterality/directionality, and fine motor activities (S.M.A.R.T. curriculum guide, 2004). The Boost Up/SMART program stresses the importance of being trained in order to properly implement the curriculum designed by their experts. They also stress that this is not a physical education program, but rather an academic program.

"Researchers know that by increasing the frequency, intensity and duration of a specific stimulation, a child's brain can become efficient in receiving and processing information" (Minnesota Learning Resource Center (MLRC), 2001, p. 2). A prominent physical therapist by the name of Oden, suggests automatic motor skills can be achieved by integrating specific movement activities that enhance the brain stem. Ideally the brain should be on *autopilot* for skills such as sitting in a chair, tying shoes, holding a pencil, and copying from the board. When the brain has to think too much, learning becomes a chore for struggling learners. Struggling learners are "coping with an immature system" (Oden, 2004, p. 5).

"Educators ought to be purposeful about integrating movement into everyday learning" (pesoftware.com, 2004, p. 7). More and more physical educators are integrating movement across the curriculum but classroom teachers have not integrated movement into their content areas. "We know that much of the brain is involved in complex movements and physical exercise-it's not just 'muscle work'" (pesoftware.com, 2004, p. 5). Abraham, in the Department of Kinesiology, at the University of Texas at Austin says, "Math teachers should have kids move in the same way P.E. teachers have kids count" (pesoftware.com, 2004, p. 7).



Current research shows that children's natural attraction to physical movement and activity plays an important role in the formative maturation of the brain (Turner & Turner, as stated in Blaydes, 2000). Turner and Turner maintain, "there is a positive relationship between being physically fit and academically fit" (2000. p. iii).

"The brain can only endure as much as the bottom can endure" states Blackwell. The brain needs down time to stay alert and rejuvenate (Jarrett, 2004). "Most children can only hold their attention equal to his or her age plus two" (Blakemore, 2003, p. 24). "For people of all ages and in all fields, breaks are considered essential for satisfaction and alertness (Olga, 2004, p. 1).

Jarrett defines recess by quoting Pellegrini and Smith; "a break period, typically outdoors, for children" (Jarrett, 2004, p. 1). Recess and play are often overlooked as important activities to boost academic learning. "Providing two recesses thirty minutes each in duration, in addition to the frequent classroom activities, is optimal" (Jensen, 2000, p. 27).

When we look at the summaries from Jensen's books, *Teaching with the Brain in Mind* and *Learning with the Body in Mind*, we find that the growing body of research extolling the cognitive benefits of physical exercise studies, conclude that mental focus and concentration levels in children improve

significantly after engaging in structured physical activity (Caterino & Polak, as cited in Blaydes, 1999). The findings suggest that such physical exercise as running, jumping, and aerobic game playing have a definite impact on children's frontal primary brain area for mental concentration, planning, and decision-making. The President's Council on Fitness and Sports suggests 30 minutes of physical activity a day to stimulate the brain.

Researchers (Pollatschek & Hagen, as cited by Blaydes, 1996) say, "Children who engage in daily physical activity show superior motor fitness, academic performance and attitude toward school as compared to their counterparts who do not have physical education." This shows that there are two aspects of movement that benefit learners: Physical fitness is having a healthy body and healthy mind. Cognitive reinforcement is using a kinesthetic tactile approach to anchor academic concepts.

Movement prepares the brain for optimal learning. Blood traveling to the body feeds the brain the needed nutrients of oxygen and glucose. Each time you think, you use up a little glucose. "Glucose is to the brain what gasoline is to a car-brain fuel" (Blaydes, 2004). Brain activity is measured by glucose utilization. A human exchanges about 10% of his/her oxygen with each normal breath, meaning that about 90% of the oxygen in our body is stale until we deep breathe or exercise.

A lack of oxygen to the brain results in disorientation, confusion, lack of concentration and memory problems. Vigorous activity gives the brain its needed nutrients (Blaydes, 2004).

When humans exercise, the body and brain goes into a homeostatic state, (physiological balance in the body) balancing brain chemicals, and system functions. When the body and brain are out of balance because of physical inactivity, the student is not in a good learning state. Movement, physical activity, and exercise put the learning state into one appropriate for retention and retrieval of memory. This evidence is a sound argument for daily quality physical activity and/or recess (Blaydes, 2004).

Many researchers (Houston 1982, Ayers 1972, Hannafor 1995) verify that sensory motor integration is fundamental to school readiness. In a study done in Seattle, Washington, third grade students studied language arts concepts through dance activities. The students involved in the dance activities, boosted their reading scores by 13 percent in 6 months. A complete routine included spinning, crawling, rolling, rocking, tumbling, pointing, and matching. Palmer has documented significant gains in attention and reading from these stimulating activities (Palmer, 1980). While many educators know of this connection, nearly as many dismiss the connection once children pass the first or second grade. Research suggests

the relationship between movement and learning continues throughout life.

We are in a time of education when many children don't participate in physical education. Budget cuts often target the arts and physical education as "frills." This is a shame because there's good evidence that these activities make school interesting to many students and they can boost academic performance. "Physical activity is essential in promoting normal growth of mental function," says Donald Kirkendall, (Pollatschek & Hagen 1996, pg. 9).

Recess and free play provide children with valuable time to stretch, bend, and release energy. Through this freedom, children learn to enjoy movement for its own sake. It allows them to practice cooperation, respect for rules, taking turns, sharing, using language to communicate and solving problems in real life situations. These are all important skills that can help them in the classroom (parentspot.com).

Many brain research experts are advocating for daily physical education in educational circles citing evidence that supports the link of movement to learning. This is what some of the leading experts in compatible learning say:

Dr. Gardner, author of *Frames of Mind*, declared one of his eight multiple intelligence as the kinesthetic multiple intelligence. "If physical education is cut from our school,

one eighth of human intelligences are eliminated." Dr. Marion Diamond, author of *Magic Trees of the Mind*, whose research on enriched environments showed the importance of play in early brain development. This critical motor development sets the stage for brain processes used later for decoding and problem solving. This is a strong argument for daily elementary physical education starting in kindergarten.

Dr. Pert, author of *Molecules of Emotion*, tells of the importance of proper diet and exercise. Learning happens throughout the body, not just in the synaptic connections of the brain. Healthy active students make better learners. Dr. Sylwester, author of *A Celebration of Neurons and a Biological Brain in a Cultural Classroom* says that "movement facilitates cognition". He also says that the reason humans have the brain we do is because we move. He also points out that a central mission of the brain to intelligently navigate its environment. Therefore, learning must include movement, concepts, and skills (Blaydes, 2004).

Kovalik, leading authority on brain compatible learning whose research has served 250,000 students, says movement to enhance learning is one of the brain compatible components based on brain findings. She believes that students retain information better when movement with intention is used to teach academic concepts kinesthetically. Jensen, outlines the

causes of changes in several learning differences. He concludes that movement, rhythms, physical activity and exercise help control many of the conditions such as ADD, Dyslexia, Hyperactivity, Oppositional Disorder, Learning Delays, and Reactive Attachment Disorder. Many students with learning disabilities find success in the gym because the schools curriculum meets their needs in a way that the traditional classroom may not.

It used to be that the biggest decision students had to make was whether to spend the afternoon recess playing kickball or mastering the monkey bars. Higher academic expectations are forcing teachers to squeeze more instructional time out of each school day (parentspot.com. 2004). Many experts believe that a steady diet of television and computers is a prime reason for declining health in children (parentspot.com. 2004). When students spend time moving and exploring outdoors, they also begin to develop the same types of investigative skills that will help them when tackling subjects such as science and math.

Physically active children have a greater chance of being healthy for life. They are also more likely to do better in school. According to a study in the Journal of School Health, physically active children showed increased concentration, improved mathematics, reading and writing test scores and reduced disruptive behaviors. Regular physical activity also

helps ensure the strength and physical development children need to hold a pencil properly and form letters and numbers, hold their heads and bodies upright for lengths of time, and make proper eye contact with teachers as they learn (parentspot.com.2004).

"Recess is the right of every child." Article 313 of the United Nations Convention on Children's Rights states that every child has the right to leisure time. Taking away recess, whether as a disciplinary measure or abolishing it in the name of work, infringes on that right." [Skrupskelis, as cited in Clements (2000).

Physical activity fuels the brain with a better supply of blood and provides brain cells with a healthier supply of natural substances; these substances enhance brain growth and help the brain make a greater number of connections between neurons (Healy, 1998). The connections make the brain better able to process a variety of information, thus leading to improved retention of facts, a greater understanding of concepts, and subsequently higher achievement.

Examples of content areas that can be explored in context outdoors and on a playground include:

the natural elements: experiencing wind, dirt, water, and seasons

physics: using a seesaw, merry-go-round, and swings

architecture and design: building with natural materials

math and numbers: counting, keeping score

language development: explaining, describing,

articulating, seeking information, and making use of oral

language/vocabulary/word power (Dennison, 1999).

To enhance whole-brain learning, Dennison suggests using simple and enjoyable movements. These activities make all types of learning easier, and are especially effective with academic skills. (Dennison, 1999.) Traditionally, educators have addressed failure by devising programs to better motivate, entice, reinforce, drill and "stamp in" learning. These programs succeed to a degree. However, why do some learners do so well while others do not? In Educational Kinesiology, whole-brain learning is used as well as movement re-patterning. Through Brain Gym activities students access the parts of the brain previously inaccessible to them. The changes in learning and behavior are often immediate and profound, as children discover how to receive information and express themselves simultaneously.

For more than fifty years, educators in behavioral sensori-motor training have provided statistical research showing the effects of movement upon learning. Dr.



Dennison's familiarity with this research, led this information to be put into quick, simple, task-specific movements that benefit every learner.

Many teachers use all of the Brain Gym movements in their classrooms every day. Other teachers use only the movements related to reading, during their reading time. Often doing the Brain Gym movements for a specific skill will allow the student to make an immediate improvement in behavior or performance.

"When students are introduced to Brain Gym, they seem to love it, request it, teach it to their friends, and integrate it into their lives, without any coaching or supervision." (Dennison, 1999, p. 2).

When students are given the opportunity to move in their own way, they are capable of completing the learning cycle. "With support, and permission to move in the classroom in a positive manner, students will unfold into unique and complete intelligence in a way that is natural and easy" (Dennison, 1999).

Today's brain, mind, and body research establishes significant links between movement and learning. Educators ought to be purposeful about integrating movement activities into everyday learning. This includes much more than hands-on

activities. It means daily stretching, walks, dance, theater, drama, seat-changing, energizers, and physical education. The whole notion of using only logical thinking in a mathematics class flies in the face of current brain research. Brain-compatible learning means that educators should weave math, movement, geography, social skills, role play, science, and physical education together. In fact, Abraham in the Department of Kinesiology at the University of Texas at Austin says, "Classroom teachers should have kids move for the same reason that P.E. teachers have kids count" (1997). Physical education, movement, drama, and the arts can all be one continual theme. (pesoftware.com, 2004). Hannaford says, "Arts and athletics are not frills. They constitute powerful ways of thinking, and skilled ways of communicating with the world. They deserve a greater, not lesser portion of school time and budgets" (Hannaford, 1995, p. 88).

Recent brain research highlights the importance of early literacy experiences for children. Research also gives insight on developing reading readiness skills more effectively in our classrooms (Jensen, 1996). Not surprisingly, brain-based learning reaffirms and validates what good teachers of young children have been doing naturally for years!

Children need rich experiences that are meaningful

and interesting. Only with firsthand experiences do children have something with which to connect learning. Children's brains also enjoy novelty and new things that will challenge and stretch them to the next level.

One of the most curious observations made by brain researchers is that physical movement is important to learning. A child's movement is quite natural until they enter school, where there is less and less opportunity to integrate movement and physical sensing into learning experiences. A few subjects that retain this important aspect of learning are the arts and the physical sciences. Though some efforts have been made by psychology and sociology teachers to incorporate experimentation and real life involvement, the teaching process has relied on students sitting at desks listening to a lecture or watching a demonstration in order to develop knowledge of the area being taught.

If we are to better educate our students then we must acknowledge the importance of movement. The purposeful change of place, position, or posture as part of the learning process, and physical encoding - the learning process which uses the physical body to transfer information from the abstract or symbolic level to a more concrete level - are integral to this movement, and can produce more precise learning with a

higher rate of retention. Encoding techniques might consist of the use of rhythms, role playing, physically manipulating materials and the creation of situations or actual events.

As gym classes get scaled back and sedentary pursuits like video games become ever more popular, children are getting less and less daily physical exercise. We need to make sure all kids are exercising daily. Some ways we can do this is by exposing our children to a movement based curriculum.

In conclusion, this research has caused me to more fully appreciate the complexities of students and learning. Organizing an efficient learning environment that promotes responsibility, respect, cooperation, and movements sets the stage for a productive classroom. My teaching journey continues as I reflect upon my second grade classroom in light of my new guidelines of establishing an effective moving environment. They are many steps that I have taken to create an action based learning environment, and many more that can be used to strengthen the foundation of positive learning outcomes.

In the course of this study, I have come to realize the importance movement plays in contributing to an effective learning environment for my students, and I am eager to adapt this new knowledge in my classroom. I learned the importance of movement in the learning process and will be teaching

academics kinesthetically. I have a new appreciation for the importance of developmentally appropriate movement in every aspect of a child's life. I've learned that movement and active play not only contribute to a child's physical development but also to their social/emotional and cognitive development. Based on these results, I can see the benefit of adding movement in my classroom. Because of this belief I have exceeded my loftiest expectations! Truly, my role as a researcher has been a dynamic one in my quest for knowledge on the subject of movement and learning. Movement should play a vital part in the design of classrooms today and in the future.

#### Vocabulary Words

BOOST UP/SMART- S.M.A.R.T. (Stimulating Maturity through Accelerated Readiness Training). This is a method of producing readiness skills to improve early academic achievement. The program was developed by Lyelle Palmer, Ph. D., in conjunction with Bob DeBoer, Co-Director of New Visions School in Minneapolis, Minnesota. Their study of brain development/neurophysiology has been instrumental in identifying activities that stimulate brain development and growth in the early years.

Brain Gym Activities - Brain Gym is made up of simple and enjoyable activities that teachers can use in the classroom to enhance their experience of whole brain learning. These activities make learning more effective. Whole-brain learning through re-patterning and Brain Gym activities enables students to access parts of the brain previously unavailable.

DRA Tests - (Developmental Reading Assessment) DRA Tests are an individually administered, criterion-referenced assessment conducted during a one-on-one reading conference. The DRA is administered three to four times each year to all students in second grade. Results are used to determine a student's instructional reading level, guide the teacher in planning the classroom instructional program, identify appropriate supports and interventions, and document progress over time.

Educational Kinesiology - A simple and highly effective system of targeted activities that prepare the brain and the entire nervous system for optimal performance in all areas.

STAR Tests - Measures students' reading comprehension and math computations through computerized testing. STAR Reading helps the teacher determine the reading level of each student, measure individual and class growth, and forecast results on standardized tests. Students can complete the computer-adaptive assessment in less than 10 minutes, and teachers get accurate, reliable, norm-referenced scores immediately! STAR Math tests help students learn independently and improve problem-solving skills. It also accurately assesses the skill levels of each student.

Successmaker Scores - This is a computer assisted learning program covering curriculum areas of math and reading that is individualized and varies according to abilities of each student.

## METHODOLOGY

### Subjects/Participants

This study took place at an elementary school in Hartford, South Dakota during the 2004-2005 school year. The elementary school is located in a rural area, and the

students are from a middle socio-economic status.

Currently, there are approximately 250 students enrolled in this elementary school. The school houses three classrooms of second grade. Nineteen students from two separate second grade classrooms were involved in this study. This classroom did movement activities that were appropriate for this age group. The controlled classroom did not use movement activities. The participants of this study were involved in a movement curriculum.

### Design

The assessments of the students experiencing Brain Gym movement activities were informal and formal. The researcher evaluated the students' progress by observing what movements the students were performing (informally) and how they explained them to the teacher during conversations. Also, the teacher observed what the students wrote in their daily journals. Informally reviewing the students journals by reading the journal entries indicated whether or not the students understood a particular concept that was currently being studied. The teacher formally evaluated the students' journals, STAR Tests, Successmaker Tests, and DRA Scores, and recorded the results on a Mid-Term Report and individual evaluation and assessment forms(Appendix D). These assessment forms were

placed in the students' folders to be used with the report cards. The purpose of these evaluations was to determine the students' progress, evaluate, plan instruction, and make changes. These evaluations and assessments were also used to communicate with the parents about their child's progress.

Surveys were filled out by the parents in September to determine what their opinions were on the Brain Gym activities, the students' grades, and what the parents wanted to see in their child's folder at conferences. In November and February after parent-teacher conferences, two other surveys were filled out by the parents to determine what they thought of their child's progress, and reading and math tests (Appendix B). The students also answered survey questions about their writing journals and folders for conferences about the same time that the parents completed their surveys (Appendix C). The results from these surveys were used to collect data for this study. Information was gathered by direct observations of students experiencing the Brain Gym movement activities. Additional facts were collected through formal interviews and/or informal discussions with students, teachers, principal, parents, and physical education teachers. STAR Reading, STAR Math, Successmaker Reading, Successmaker Math, and DRA assessments were used to examine the facts related to this study.



Material gathered was analyzed and used to form general assertions. These broad assertions were either supported or not through further information collected. This study is intended to show the effectiveness of Brain Gym in the classroom to increase academic skills.

This study includes consideration of research conducted in areas other than movement. The reason for this was that one second grade classroom in our district, but located in a different community, had not been using movement in the classroom. The objective was to see if it made a difference in the classroom performance in connection with a controlled classroom.

This study is also designed to examine whether the frequency of movement has a correlation with student output of the second grade curriculum.

### Procedure

The first step in implementing this study involved discussing the study with the principal and gaining her approval. A letter was sent home with the students who

participated in this research project with an explanation of what the study involved. The letter indicated that the students' grades would not be affected by their participation in the study (Appendix A).

At the beginning of the research project, the researcher explained to the students that they would be involved in a Brain Gym study. Briefly, the teacher outlined how the movement study worked and what was expected of the students. The students were encouraged to be involved in the Brain Gym movement activities every morning.

The teacher followed guidelines of the school district and used the second grade curriculum to focus on the concepts taught. The students were given freedom of choice to stand where they wanted before we started. The teacher gave the students directions on how to perform the Brain Gym activities, and the students would emulate the exercises.

At the end of the sessions, the students were involved in journal writing on what they thought of the Brain Gym activities. They also could write about how the activities got them started for the day or if they felt it didn't make a difference.

To implement the Brain Gym exercises, the teacher modeled the step-by-step process until the students became familiar

with the exercises. The teacher modeled the activity process in a whole group activity by demonstrating to the students the proper way to perform the exercises. The teacher would then involve the students in the Brain Gym exercises. The students were provided with many examples of the Brain Gym exercises. At the beginning of the Brain Gym process, the students used their copies of the Brain Gym activities to perform each exercise. As the students progressed in their Brain Gym exercises, the teacher would have the students perform the activities without the copies. By the end of the study, the students were doing the Brain Gym activities with great skill and confidence. Appendices E-R show specific Brain Gym activities the students are engaged in. This also includes an explanation of each exercise.

### Results

Data was collected from informal and formal assessments. The researcher informally evaluated the students' progress by observing what the students wrote in their journals after performing the Brain Gym movements. The teacher formally

evaluated the student's tests results in September and February, and recorded the results on individual assessment forms. Data was also collected from the surveys that were filled out by the parents and the students. The teacher's evaluations of the data collected from the parent/student surveys and reading/math tests were used to reach a conclusion on movement in the classroom and learning.

The results of the study reaffirmed the researchers belief that students do learn by using the Brain Gym activities.

#### Analysis of the Data

In September, a survey was filled out by the parents, mainly to find out if the parents felt it was important to have their child ready to learn each day by implementing movement in the classroom and be well informed of their child's progress. In November, at conferences, the parents filled out another survey, and the most important question on this survey pertained to their opinion on using Brain Gym in the classroom. After parent-teacher conferences in February, the students and parents filled out a survey that was identical to the November survey. The data collected from the last survey would be the most significant in analyzing the students' attitude toward Brain Gym

activities. Graphs were used to analyze and calculate the data on the parent/student surveys. The questions for the February parent surveys were analyzed as follows:

1. Do you feel that you were adequately informed of your child's progress?

100% of the parents agreed.

2. Do you feel that the Brain Gym exercises increased your child's academic skills?

100% of the parents agreed.

3. Do you feel that your child's academics and Brain Gym activities adequately supports his/her report card?

100% of the parents agreed.

As a result of this study, the researcher feels more confident about the evaluation and assessment techniques, which include observation over time and documentation of performance work.

The enthusiastic participation of the students in this study reflected their belief in the Brain Gym activities. Of particular value to the researcher were the DRA scores, STAR math/reading tests, and Successmaker reading/math tests.

### Discussion

During the first few weeks of class, a majority of the students expressed a negative attitude toward the Brain Gym activities. However, once the students learned how their body and mind reacted to the activities, and the benefits

that come over time, they participated very willingly. In addition, their attitude and participation levels improved when they experienced a good feeling as a result of the brain exercises. Some of the more observable results of the study came when viewing these students in other areas outside the classroom. For instance, on the playground, I observed students making better choices when playing games, and sometimes they chose to teach other students how to do Brain Gym activities. In addition, the students made comments to other peers and teachers about their "new" activities being used in the classroom. The main emphasis when completing the Brain Gym activities was to identify any possible concerns by recognizing a solution, and making a commitment to solve any problems that may arise.

The research supported the hypothesis that students who are involved in Brain Gym movement activities, can increase their learning. By doing action research on Brain Gym movement activities I found my students were alert and ready to begin the day. In conclusion, I found that Brain Gym activities played an important role in their listening and learning. Because of the change in the participants' exercise performance, the subjects developed a better attitude toward physical activity and experienced improved classroom

performance. I also saw a significant increase in vocabulary, reading comprehension and math skills.

Furthermore, as the participants started to understand the "how's and why's" of brain based activities, through their individual journal writing, they reported a better self-image. This also resulted in a more positive learning environment. Throughout the study, I found such individual improvements justified the importance of Brain Gym activities that should be implemented in the classroom. In addition, I found that negative attitudes toward physical activity came from not understanding the need or benefits of exercise. Prior to the study, it appeared that the students perceived working out and doing physical activities as a form of punishment or pain that they had to do in physical education class.

Surprises that occurred throughout the study included how quickly the students were willing to participate in the classroom activities, as well as how involved they became in this research project.

They were excited about being a part of an experiment! As an educator, the participants' willingness and excitement made it fun and inspiring to conduct a teacher research study. There were even comments from our school's physical and occupational therapists' wanting to know what the class was doing. The books

on Brain Gym activities and research were shared with them as well as the research done.

Most importantly, the positive changes in the students' abilities, confirmed the importance of physical activity in the classroom. Brain Gym activities not only allowed the students to move, but enabled them to feel a sense of hope and to make choices in the classroom. This study will be presented to peers in our district to confirm the importance of using Brain Gym activities in order to help facilitate learning in the classroom.

One of the most curious observations the researcher made was that physical movement is important to learning. A child's movement is natural until entering school, where there is less and less an opportunity to integrate movement and physical sensing into the learning experience. The teaching process has relied on students sitting at desks or watching a demonstration in order to develop knowledge or the subject area being taught.

The data collected from the parents' survey indicated that the parents supported the use of Brain Gym in the classroom. One-hundred percent of the parents indicated on the survey that Brain Gym activities increased their child's ability to complete their work and stay focused.



Some of the comments from parents included:

"Brain Gym activities are a great chance for my son to stay active."

"I am happy you are doing something in school to help my child with self-esteem."

"I think the Brain Gym activities are great for starting the day and keeping the students focused."

"I think this should be done throughout the school."

"The benefits throughout the year will be amazing."

One other surprise the research observed was: The improvements in the students' Successmaker reading and math test scores, DRA scores and STAR math and reading tests. All of the students utilize Successmaker (reading and math computer generated curriculum) four days a week. Successmaker is a great program because it advances to the next level according to how the students are progressing. Successmaker is computer-generated worksheets that target the specific learning needs of individuals. The researcher's entire classroom advanced to the next level (Readers Workshop) so rapidly it was amazing. Take into consideration that the researcher has several Title I students who have been identified as needing extra services in reading and math. They are taken out of the regular classroom setting and work with a Title I teacher.

Normally students come into second grade at the Initial

Reading Level. This level builds sight vocabulary, decoding and reading comprehension through word, sentence and passage reading practice and assessment. They also use phonemic awareness and phonics activities. This level is intended for K-2 grades.

The next level is Readers Workshop. This level is geared for grades 2-5. Readers workshop builds vocabulary and comprehension, accelerating the development of reading required in standardized tests. This is done through systematic reading instruction and skill-building using high-interest reading passages and by focusing on essential skills such as word analysis, word meaning, literal comprehension, interpretive comprehension reference skills and passage comprehension.

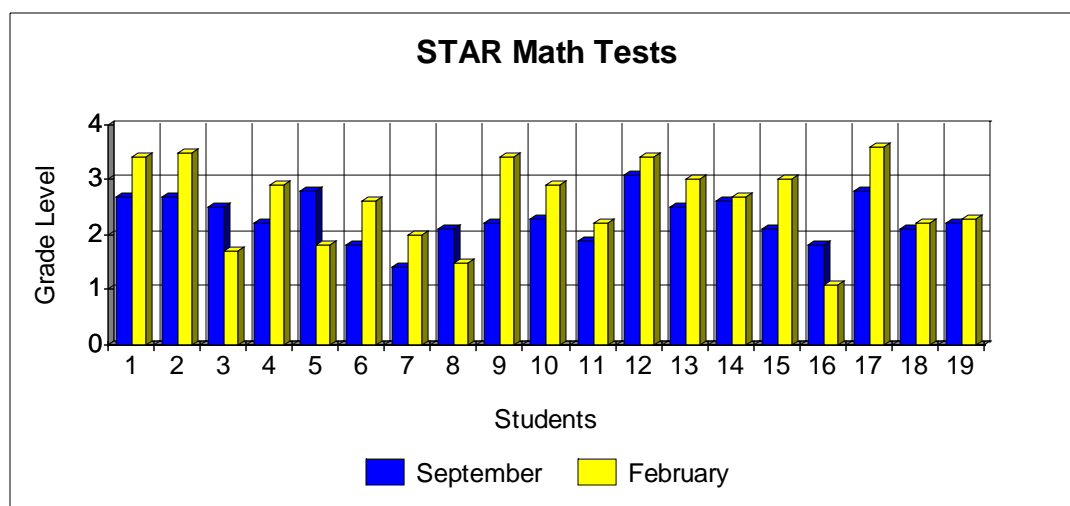
Is this study showing growth because of natural maturation or because of using the Brain Gym activities? The researcher feels the students are showing growth because of the Brain Gym activities as well as natural maturation.

In addition, the use of Brain Gym activities seem to increase positive attitudes as well as achievement at the second grade level. The collaboration of Title I teachers as well as parent volunteers was one of the strengths in conducting this movement research project.

There may have been certain limitations of this study.

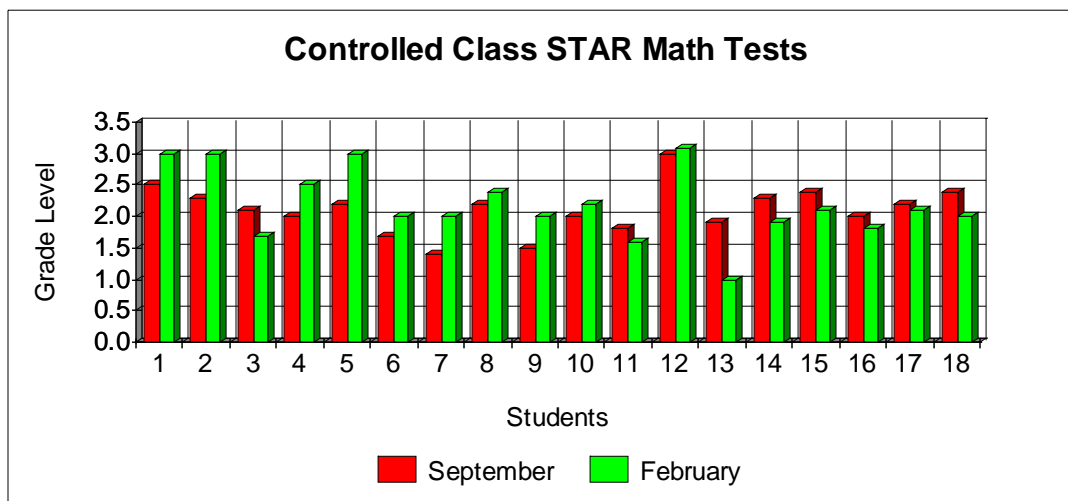
Although valid, I acknowledge that measurements were taken in September and February, rather than throughout the school year. Students may have responded differently when learning certain reading and math concepts.

The researcher also realized that distinguishing and evaluating responses according to male and female differences would have been interesting and helpful to educational research on gender issues. Other factors that need to be considered are the ability of second grade students to follow along with the movement activities, the reading and math tests, and to stay on task for the number of items necessary to insure validity and reliability of the instruments used. However, teacher observations reflect that most students appeared to take the surveys seriously and answered honestly. The following figures illustrate the changes made during the study:



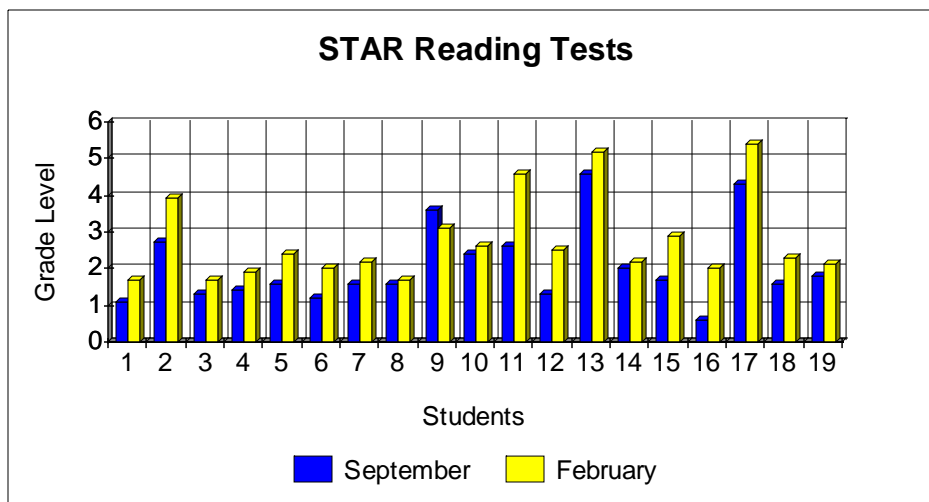
According to the STAR math graph, 14 of the 19 students' scores increased when using Brain Gym activities, while five students' scores decreased.

The following figure shows the results of the Controlled Classroom:



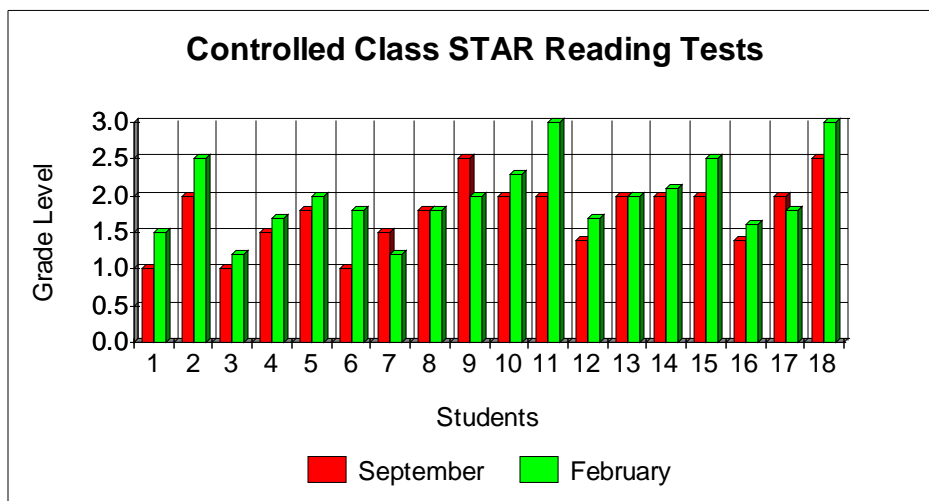
According to the scores of the STAR Math Controlled classroom, the graph shows that ten students' scores increased, while eight students' scores decreased, showing that by implementing the Brain Gym activities in the classroom, students' academic scores improved.

Another finding included the STAR Reading Tests: Again with the classroom using the Brain Gym activities their results were significantly higher than the Controlled classroom where Brain Gym activities were not used.

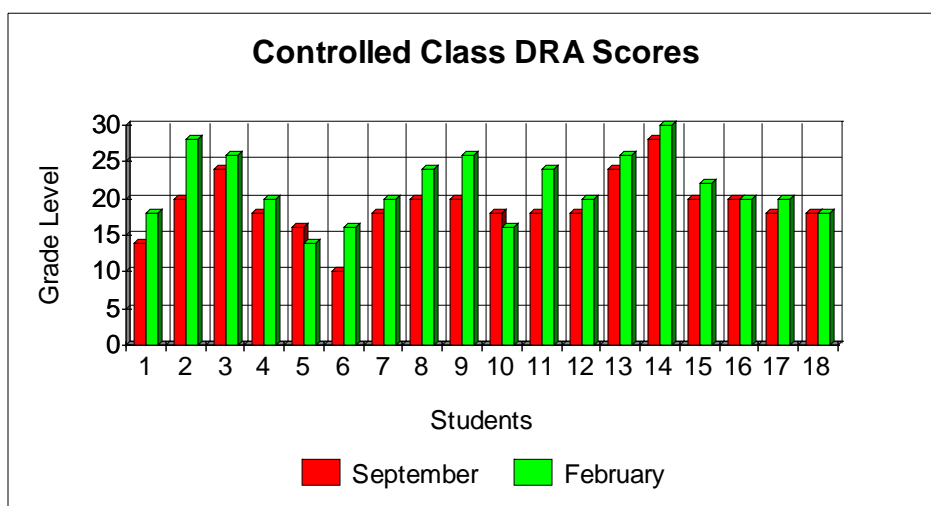
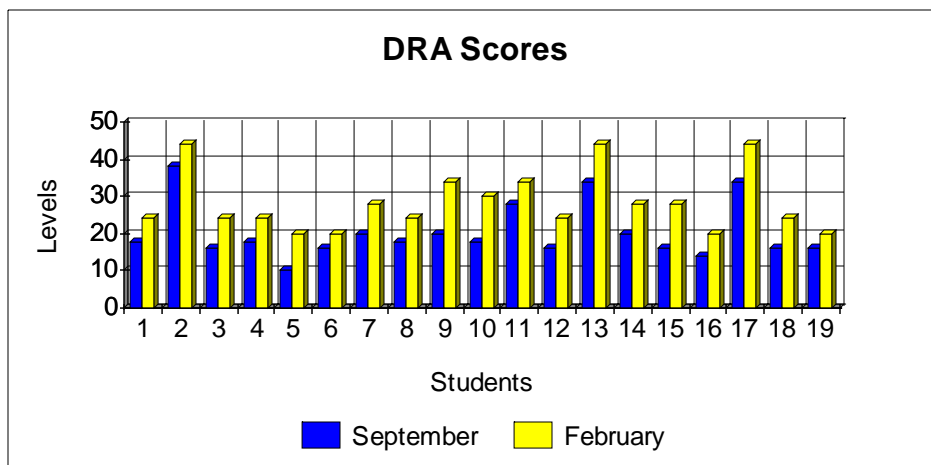


According to the STAR Reading tests, 17 students' scores increased, one stayed the same, and one decreased while using the Brain Gym activities.

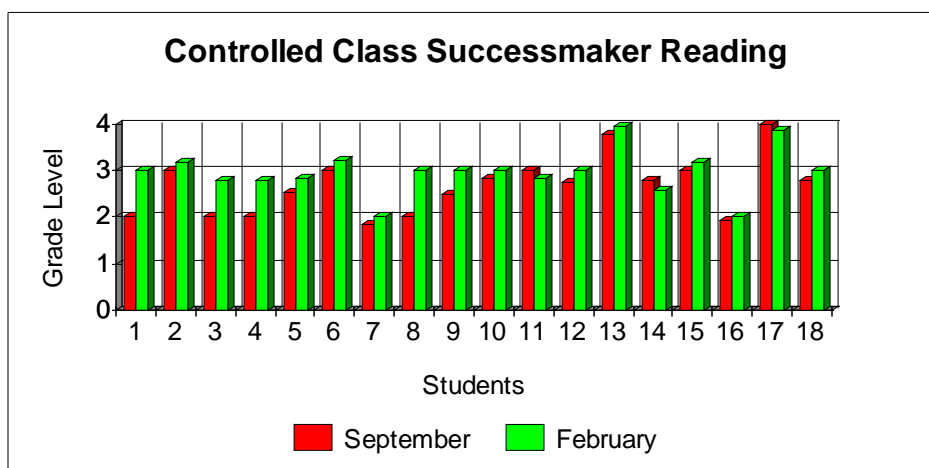
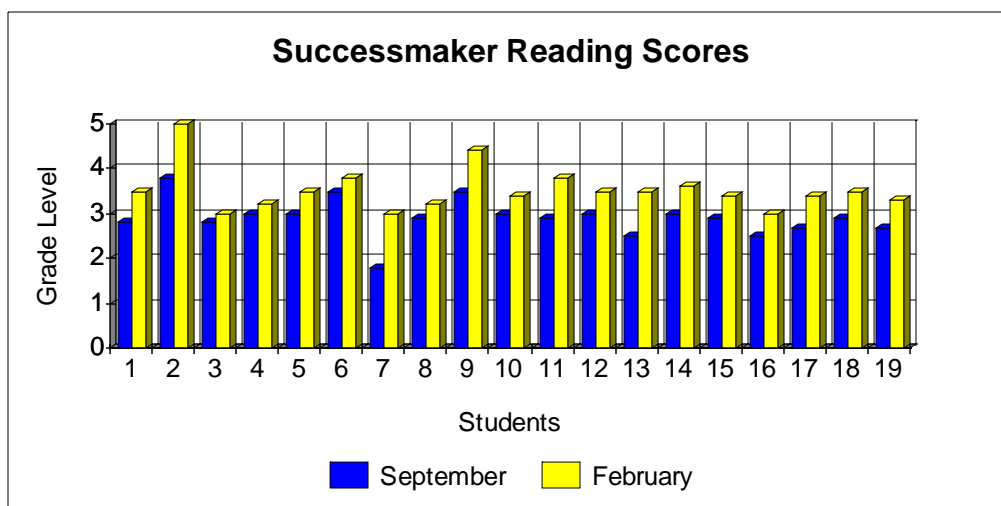
The following figure shows the results of the Controlled classroom:



With the Controlled Class, 13 students' scores increased, 3 students' scores Decreased, and two remained the same.

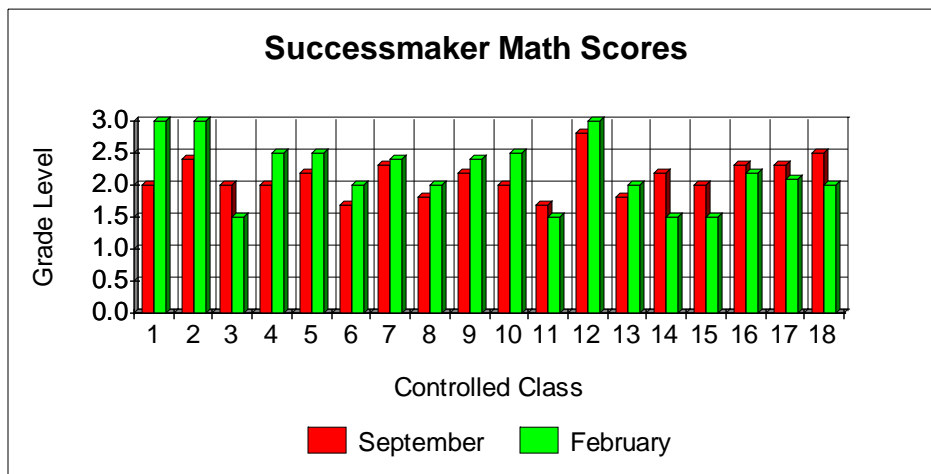
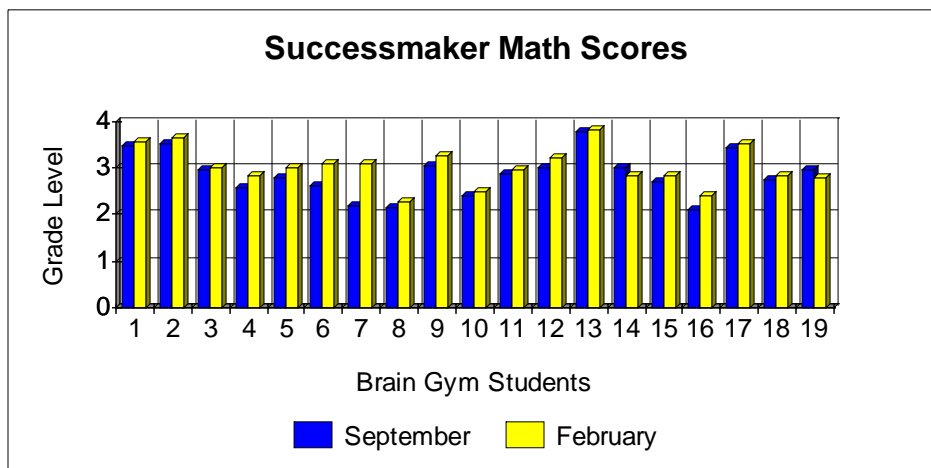


With the Brain Gym Class the results showed all the students' scores increased. With the Controlled Class DRA Scores, the results showed 14 of the 18 students showed an increase in their scores, while 2 students' scores decreased and two students' scores remained the same.



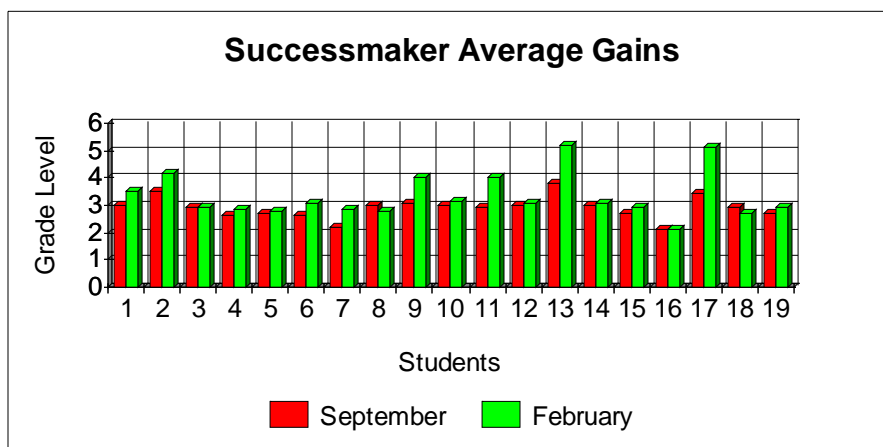
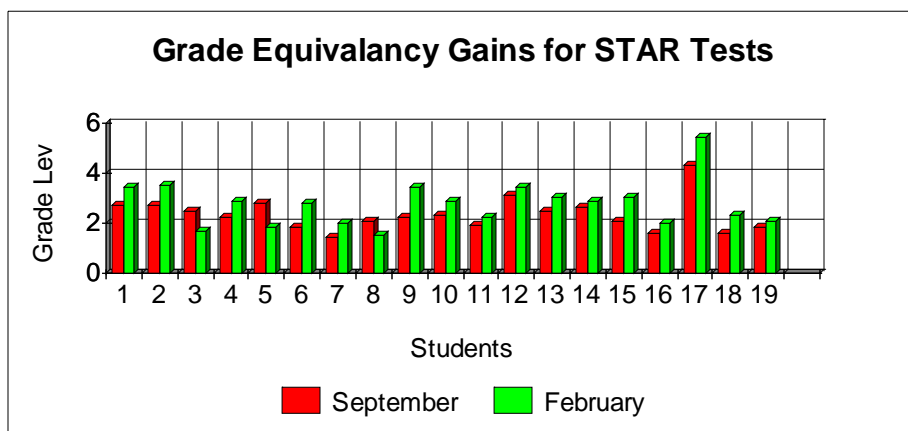
The analysis in these Tables simulates how the difference between the controlled classroom and the classroom using the Brain Gym exercises made a difference by using the assigned exercises. In the Brain Gym classroom all of the students' scores increased. In the controlled classroom 14 of the 19 students' scores increased, 3 students scores decreased and 1 student's score remained the same. Two strong assumptions were made: The first assumption is that the students gained in all academic areas with the use of Brain Gym activities. The second assumption is that the students made academic gains because of their natural maturation. Some reasons that this is true may be due to the fact that some students test better on certain days than on others.

According to the following graphs, the Controlled classroom scored lower than the Brain Gym classroom on the Successmaker Math Tests.

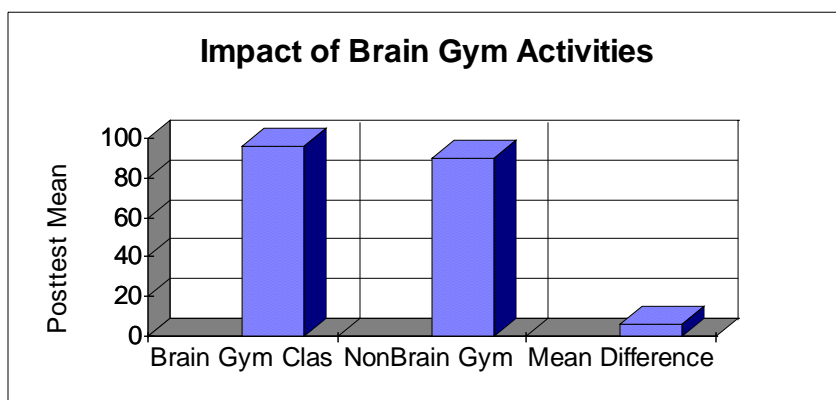
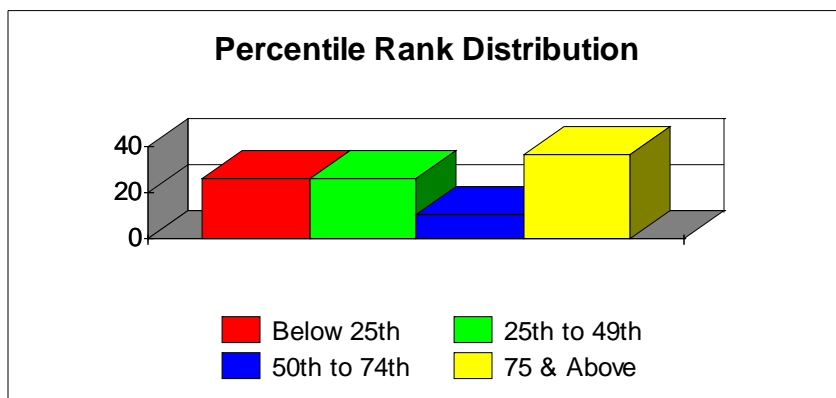




The following graphs indicate the grade equivalency gains in the STAR tests, and the Successmaker average gains for the Brain Gym classroom.



With the Percentile Rank Distribution chart, overall the Brain Gym classroom Showed more students at the 75 percentile rank and higher.



It is very evident by the graphs that the increases of student academics are apparent by implementing the Brain Gym activities.

The formal and informal assessments of the students' tests indicated that there was an increase with their DRA Scores, STAR Reading test scores, STAR Math test scores, Successmaker Reading scores and Successmaker Math scores. The

data collected from the parent and student surveys also supported the research's findings. The data collected also indicated that Brain Gym activities can be used to support the information on report cards if the purpose of the Brain Gym activities is to enhance the curriculum and meets the second grade curriculum goals.

The research supported the hypothesis that students who are involved in Brain Gym activities can increase their academic skills in an elementary classroom. According to the findings of this study, Brain Gym activities enhanced the curriculum and showed the academic progress of the students. The data collected from the parents survey indicated that the parents supported the use of Brain Gym activities in the classroom. Some of the comments that parents wrote about the Brain Gym activities include:

"Brain Gym is a great chance for students to express themselves freely."

"I think it will help my child be more creative, and ready to start their day."

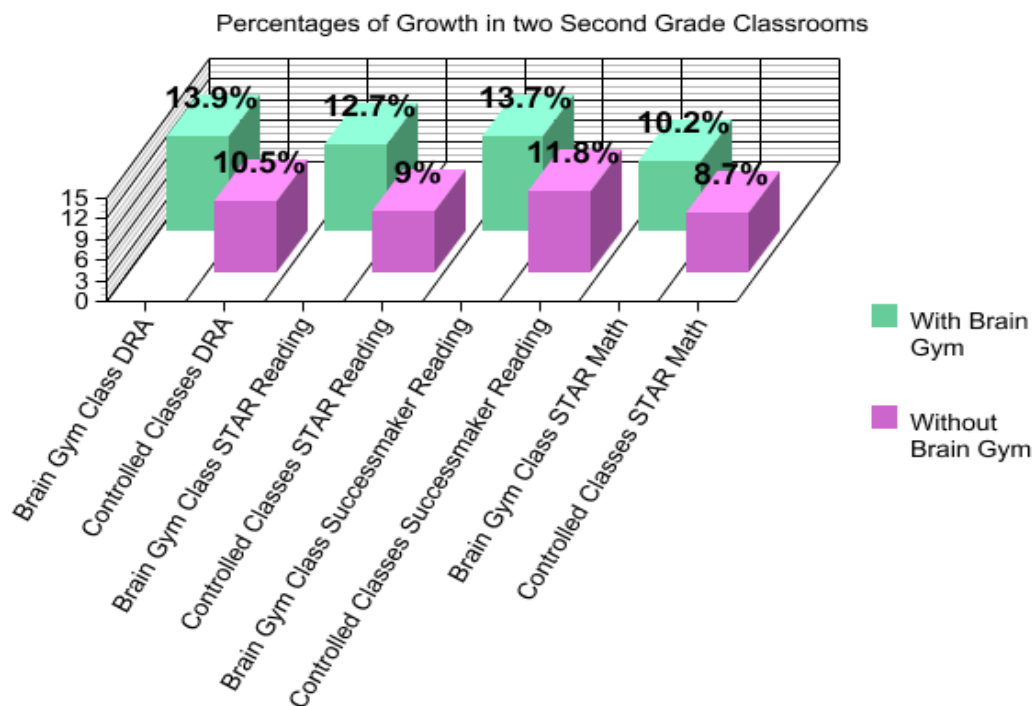
"The Brain Gym activities are great ways to get and keep our children moving."

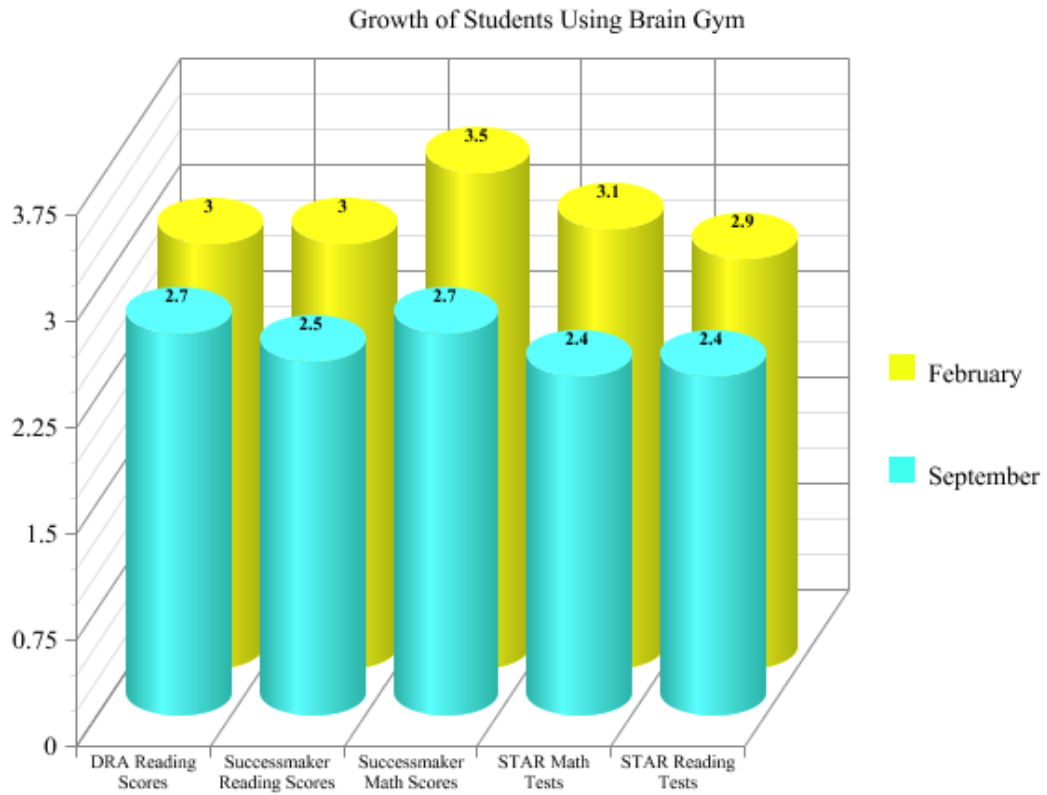
"It is fun to see how my child has progressed throughout the school year."

The data collected from the students surveys also support the hypothesis that Brain Gym activities can increase the

students' academic skills. Eighty-Five percent of the students said they like to be a part of the Brain Gym activities and 95% of the students said they like to see that by doing the Brain gym activities their grades have improved as well as their DRA scores, Successmaker scores, and STAR scores. Students at this age know when they have done their best to produce great work.

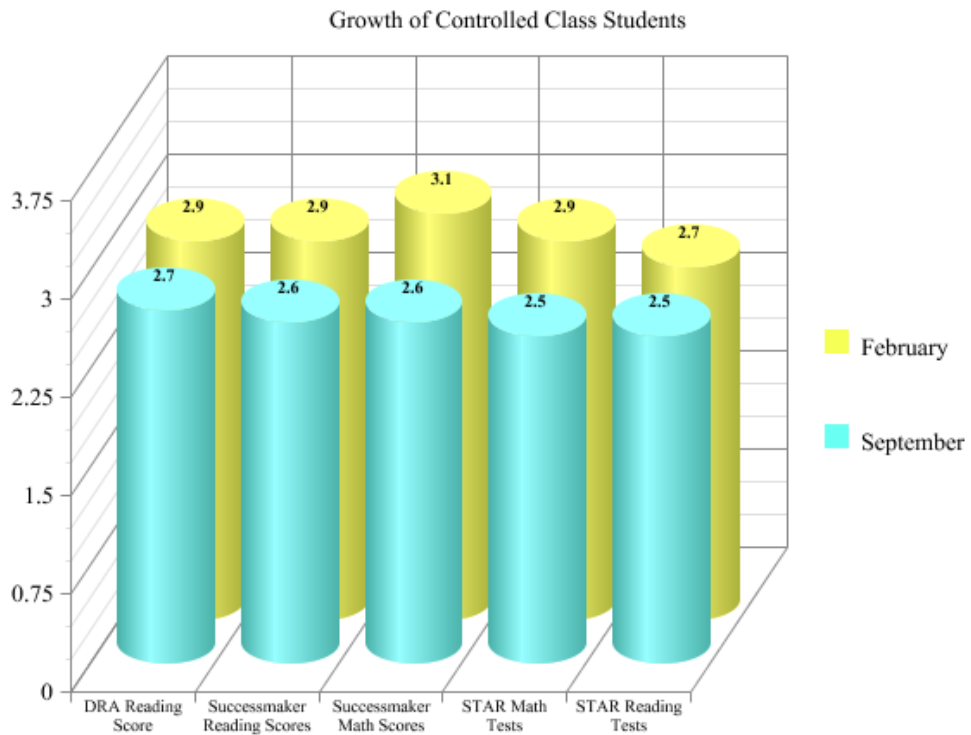
As indicated in the following graph, there has been a larger increase in scores with the Brain Gym class than with the Controlled class.





Source: Second Grade Class Data

These two graphs indicate the growth by grade level of the students using Brain Gym activities and the Controlled Classroom, which was not involved in the activities.



Source: Controlled Class Data

### Conclusions

In conclusion, the researcher has found that Brain Gym movements play an important role in school success. Because of changes in the participants' exercise movements, the subjects developed a better attitude toward Brain Gym movements and reported a better self-image resulting in a more positive learning environment. Throughout the Brain Gym study, the researcher found individual improvements of the students that justified the importance of Brain Gym activities in the classroom.

The results of this study support the findings of other researchers and teachers who have conducted studies in which students used Brain Gym activities in the classroom. In addition, the results of these studies suggested that students can use these simple, enjoyable movements to enhance their experience of whole-brain learning in their homes as well as during informal play. The researcher of this study found that when a variety of movement activities were provided in which the students were interested in and could relate their thinking to their daily lives, the students were stimulated to think beyond rote answers and make connections to their everyday lives. Brain Gym activities not only allowed students to move, but enabled them to feel a sense of hope and to make choices

in their classroom. The review of the literature for this study indicated that Brain Gym activities increased the students' academic skills, as well as made learning fun, relevant, and meaningful.

### Recommendations

After reviewing the information in the literature which recommended that students use Brain Gym activities in the classroom and reviewing the results of this study, the researcher recommends that implementing the Brain Gym activities by:

1. Planning developmentally appropriate activities related to the Brain Gym exercises.
2. Conducting student sharing sessions to promote social interaction among the students in which they can learn different strategies from one another to help with the Brain Gym activities.
3. Using formal and informal assessments of the students' DRA, Successmaker, and STAR tests to collect data.
4. Using parent/student surveys to collect data.
5. Using report cards as a guideline to assess the students' journals on Brain Gym activities.

### Recommendations for Further Research and Evaluation

It is recommended by the researcher that further studies be conducted which involve more groups of students and teachers in replicating the findings of this study as the participants in this study were chosen from a well defined grade and were not representative of the overall population. The research was limited to the participants of the study because the sample size was small, and the students were not selected at random. Only two of the four second grade classes were involved in this study. Using the entire second grade classes in this study would have allowed for more comparisons and differences in determining if the results of this study would be the same.



This was only a five month study. Conducting this study at the beginning of the year and continuing the study to the end of the school year may have shown more growth of the participants in this study. Although the results from this study indicated that Brain Gym activities did increase the students' overall academic performance, more research needs to be conducted to determine if the results of this study would be the same if more students and teachers were involved in a study such as this one. One thing I would do different with this research would be to add another controlled classroom, and another Brain Gym classroom to gain a clearer understanding of the results.

Questions for further study:

1. How can the Brain Gym activities be made available to other teachers in the district?
2. What other kinds of movements would benefit student learning with respect to STAR tests, Successmaker, and DRA tests?
3. Could the Brain Gym activities meet with the same success if used by younger and older students in our district?

If we are to better educate our students then we must acknowledge the importance of movement. At the beginning of this project, the researcher experienced severe doubts about its validity as research capable of generating data. It seemed to the researcher that the data collected, if any, would be minimal. The researcher understands now, on completion of this study, how there has been a whole new set of information to be

passed on to others and, furthermore, that one area of research can lead into the next causing further research. Truly, the role as a researcher proved to be a dynamic one in the quest for knowledge leading to the creation of new questions that need answering in a never-ending cycle of education. Therefore, the researcher can see how important research can be in the lives of students, and also in particular, educational research to the educator. The researcher also sees significant importance to adding Brain Gym activities in the classroom.

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Appendix A

Letter to Parent/Guardian

September 20, 2004

Dear Parent/Guardian,

I am continuing my education through a Masters of Science Educational Leadership degree from Southwest Minnesota State University. As part of my graduate studies, I am conducting an action research project in my classroom. I plan to research and study the effects of using brain based movement in my classroom.

The objectives of my project are:

1. To create excitement in my classroom when it comes to movement.
2. To have an organized approach to my classroom.
3. To get all students at different stages interested and successful in academic curriculum.

The research project will involve the students and parents in a study, which may increase the students' academic performance through movement. The students will be using brain based movements throughout the study. DRA Scores, STAR Tests and Successmaker scores will be used to assess the students' growth and provide a concrete way of showing the progress he/she is making. Throughout the course of the school year, I will be sending home surveys for you to complete, and conference with you and your child about his/her academic work. Students' grades will not be affected by participation in this study.

Thanks so much for all of your help and support at home. I appreciate you and your child's participation in this study. If you have any questions, please call me at 528-3215. Thank you!

Sincerely,

Mrs. Spielmann



APPENDIX B

Parent Survey Questions

November 29, 2004

Dear Parent/Guardian,

Please read the following questions on this survey in regard to the parent/teacher conference that was conducted. Please fill out this survey and return it to me. These questions pertain to the research study that I am conducting in my classroom on movement.

- 1) Do you feel that you were adequately informed on your child's progress? (circle one) Yes No If the answer is no, what suggestions do you have that will better inform you?

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2. Do you feel that the Brain Gym activities increased your child's skills? (Circle one) Yes No Please write a comment on what you think of the Brain Gym activities?

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3. Do you feel that your child's academics and Brain Gym activities adequately supports his/her report card? Please write a comment.

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Thank you for filling out this survey. I will be asking the same questions to your child.

Sincerely,

Mrs. Spielmann

Appendix C

Student Survey Questions

Student Brain Gym Survey

Date \_\_\_\_\_

Name \_\_\_\_\_

1. How do you feel about Brain Gym activities?

\_\_\_\_\_

2. What do you like best about Brain Gym activities?

\_\_\_\_\_

3. When you do the Brain Gym activities, what is the easiest part?

\_\_\_\_\_

4. When you do the Brain Gym activities, what is the hardest part? \_\_\_\_\_

5. Do you feel that the Brain Gym activities help you get ready for the school day? \_\_\_\_\_

Why or why not? \_\_\_\_\_

\_\_\_\_\_

Appendix D

Mid-Term Report

Mid-Term Report for\_\_\_\_\_

Date\_\_\_\_\_

Topic_____	Good_____	Fair_____	Needs Improvement
Follows directions	1	2	3
Stays on task	1	2	3
Listens to books	1	2	3
Class discussions	1	2	3
Raises hands, waits turn	1	2	3
Treats others with respect	1	2	3
Completes work on time	1	2	3
Gets along well with others	1	2	3
Shows interest in reading	1	2	3
Understands math concepts	1	2	3
Participates in Brain Gym	1	2	3

Appendix D

Midterm Progress Report

Student Name: \_\_\_\_\_ Date: \_\_\_\_\_

Please read, sign, and return this report to school with your child. If you would like to discuss any part of the report, Please call me at 518-3215. Thanks! Mrs. Spielmann

Parent/Guardian Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Midterm Grade:

Comments:

Language Arts

Math

Social Studies

Science

Creative Writing

Art

Music

Physical Education

Appendix E

Brain Gym Movements

Cross Crawl Exercise



In this contralateral exercise, similar to walking in place, the student alternately moves one arm and its opposite leg and the other arm and its opposite leg.

Specific outcomes - This exercise accesses both brain hemispheres simultaneously, and is the ideal warm-up for all skills which require crossing the body's lateral midline. It also activates the brain for crossing the visual/auditory/kinesthetic/ tactile midline; left-to-right eye movements; and improved binocular (both eyes together) vision. This movement is great for academic skills such as spelling, writing, listening, and reading comprehension.

(*Brain Gym*. Teacher's Edition, Revised. Ventura, CA. 2002)

## Appendix F

### Brain Gym Movements

#### Lazy 8's



With this exercise, drawing the Lazy 8's or infinity symbol enables the student to cross the visual midline without interruption, thus activating both right and left eyes and integrating the right and left visual fields. The 8 is drawn on its side and includes a definite midpoint and separate left and right areas, joined by a continuous line.

Specific Outcomes: This activity activates the brain for crossing the visual midline for increased hemispheric integration, enhanced binocular and peripheral vision, and improved eye-muscle coordination, especially for tracking. This movement also is great for academic skills such as the mechanics of reading (left-to-right eye movement), symbol recognition for the decoding of written language, and reading comprehension (long-term associative memory).

(*Brain Gym, Teacher's Edition, Revised*. Ventura, CA. 2002)

## Appendix G

### Brain Gym Movements

#### Double Doodle



Double Doodle is a bilateral drawing activity which is done in the midfield to establish direction and orientation in space relative to the body.

Specific Outcomes: This activity activates the brain for hand-eye coordination in different visual fields, kinesthetic midline crossing, spatial awareness, and visual discrimination. This activity is good for developing academic skills such as following directions, decoding and encoding of written symbols, writing, spelling and math.

(Brain Gym, Teacher's Edition, Revised. Ventura, CA. 2002)

## Appendix H

### Brain Gym Movements

#### The Elephant



The grace and balance for which elephants are known inspired this movement. The student stands with knees bent, facing the center of the Lazy 8. The head is "glued" to the shoulder and hand pointed across the room. Then the student uses their ribs to move their whole body as they trace a Lazy 8. They are learning to look past their fingers.

Specific Outcomes: This exercise activates the brain for crossing the auditory midline, listening to one's own speaking voice, short and long term memory, thinking abilities, integrating vision, listening, whole-body movement, depth perception and eye-teaming ability. For academic skills this movement is great for listening comprehension, speech, spelling (decoding; hearing separate syllables and words), and memory for sequences as in math or digit spans.

*(Brain Gym, Teacher's Edition, Revised. Ventura, CA. 2002)*



Appendix I

Brain Gym Movements

Neck Rolls



Neck Rolls relax the neck and release tensions resulting from an inability to cross the visual midline or to work in the midfield. When done before reading and writing, they encourage binocular vision and binaural hearing.

Specific Outcomes: Activates the brain for binocular vision and the ability to read and write in the midfield, centering, grounding and relaxation of the central nervous system. This movement is also good for oral reading, silent reading, study skills and speech and language.

(*Brain Gym*, Teacher's Edition, Revised. Ventura, CA. 2002)

Appendix J

Brain Gym Movements

The Rocker



The Rocker releases the low back and sacrum by massaging the hamstring and gluteus muscle groups, stimulating nerves in the hips dulled by excessive sitting at desks. When the sacrum is freed to move, the brain, at the other end of the central nervous system, is activated as well. Circulation of cerebrospinal fluid within the spinal column is then stimulated, and the body works more efficiently.

Specific Outcomes: This activity activates the brain for centering, the ability to work in the midfield, study skills, left-to-right visual skills, and skills of attention and comprehension. This movement also is great for increasing focus and energy.

*(Brain Gym, Teacher's Edition, Revised. Ventura, CA. 2002)*

Appendix K

Brain Gym Movements

Belly Breathing



Belly Breathing reminds the student to breathe instead of holding his breath during focused mental activity or physical exertion. When he breathes correctly, there is abundant oxygen for higher brain functions.

Specific Outcomes: This activity activates the brain for the ability to cross the midline, centering and grounding, relaxation of the central nervous system and cranial rhythms. This movement is great for reading (encoding and decoding), speech and oral reading.

(*Brain Gym, Teacher's Edition, Revised. Ventura, CA. 2002*)

Appendix L

Brain Gym Movements

The Owl



The Owl Movement addresses these same visual, auditory, and head-turning skills as an owl. The owl turns his head and eyes at the same time and has extremely full range of vision. The Owl exercise releases those little tensions that develop from sitting and reading.

Specific Outcomes: This movement activates the brain for crossing the "auditory midline" (auditory attention, perception, and memory), short and long-term memory, efficient eye movement, integration of vision and listening with whole-body movements. This movement is great for listening comprehension, speech and oral reports, mathematical computation, memory and computer work.

(*Brain Gym, Teacher's Edition, Revised.* Ventura, CA. 2002)

Appendix M

Brain Gym Movements

Arm Activation



Arm Activation is an isometric activity which lengthens the muscles of the upper chest and shoulders. Muscular control for both gross motor and fine motor activities originates in this area. If these muscles are shortened from tension, activities related to writing and control of your writing tools are inhibited.

Specific Outcomes: This activity activates the brain for expressive speech and language abilities, and eye-hand coordination skills. For academic skills it is great for improving penmanship, spelling, and creative writing.

(*Brain Gym, Teacher's Edition, Revised.* Ventura, CA. 2002)

Appendix N

Brain Gym Movements

The Footflex



The Footflex is a movement re-education process to restore the natural length of the tendons in the feet and lower legs. The student grasps the tender spots in the ankle, while slowly pointing and flexing the foot.

Specific Outcomes: This movement activates the brain for back-front brain integration, expressive speech and language skills. The important academic skills that this activity helps are comprehension in listening and reading, creative writing ability, and the ability to follow through and to complete assignments.

(*Brain Gym*, Teacher's Edition, Revised. Ventura, CA. 2002)

Appendix O

Brain Gym Movements

The Calf Pump



With the Calf Pump, the student stands and supports herself with her hands on the back of a chair. She places one leg behind her and leans forward, bending the knees of the forward leg. Her straight leg and her back are on one plane.

Specific Outcomes: This activity activates the brain for back brain-front brain integration, and expressive speech and language ability. It also helps academic skills with listening and reading comprehension, creative writing abilities, and the ability to bring processes to closure.

(*Brain Gym*, Teacher's Edition, Revised. Ventura, CA. 2002)

Appendix P

Brain Gym Movements

The Gravity Glider



The Gravity Glider uses balance and gravity to release tension in the hips and pelvis, allowing the student to discover comfortable standing, and sitting postures. The student sits comfortably, crossing one foot over the other at the ankles, and reaches forward letting gravity take over.

Specific Outcomes: This activity activates the brain for a sense of balance and coordination, grounding and centering, increased visual attention (back-front brain integration), and increased energy. For academic skills this is good for reading comprehension, mental math and abstract thinking in content areas.

(*Brain Gym, Teacher's Edition, Revised.* Ventura, CA. 2002)



Appendix Q

Brain Gym Movements

The Grounder



The Grounder is a Lengthening Activity that relaxes the ileopsoas muscle group. These muscles tighten in response to excessive sitting. The ileopsoas muscle group is one of the most important in the body. Its flexibility is essential for balance, whole-body coordination, and body focus.

Specific Outcomes: These activities activate the brain for crossing the participation midline, organization, and spatial awareness. For academic skills it is great for comprehension, long-term recall, short-term memory storage, organization and computation.

(*Brain Gym, Teacher's Edition, Revised.* Ventura, CA. 2002)

Appendix R

Brain Gym Movements

Cross Crawl Sit-Ups



Cross Crawl Sit-Ups strengthen the abdominals, relax the lower back, and activate the integration of the left and right brain hemispheres.

Specific Outcomes: These activities activate the brain for left-right integration, centering, and grounding. These movements help in the academic area with reading (decoding and encoding), listening skills, math computations, and the mechanics of spelling and writing.

*(Brain Gym, Teacher's Edition, Revised. Ventura, CA. 2002)*

